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Ethnoarchaeology of foraging and the case of vanishing agriculturalists in the Amazon Basin

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ABSTRACT

Debates about ancient Amazonian social organization have evaluated characterizations from a range of sources that include ethnographically documented foraging societies and archaeological discoveries suggestive of sedentized agriculturists. This study uses qualitative ethnoarchaeological data about foraging and small-scale horticulture among the Pumé of Venezuela, and Lewis Binford's quantified database of foraging groups and environmental parameters, to develop a testable model that predicts the conditions under which Amazon Basin foragers would (or would not) intensify subsistence to the point of incorporating maize and other cultivars; as well as the conditions for reversing the process. Specific expectations for the archaeological and paleoenvironmental record are proposed as indicators, and assessed relative to what we currently know from the archaeological record.

To Lewis Binford, unanticipated variability represented an opportunity for learning (1983). In Amazon Basin prehistory, the apparent disjuncture between ethnographically observed foragers and archaeological evidence for intensive agriculture and aquaculture represent just such an opportunity. In favor of the forager scenario, nutrient-poor soils, high standing biomass, and scanty, dispersed food resources below the forest canopy appear to condition for high mobility and organizational simplicity (Gross, 1983; Johnson, 1982; Meggers, 1992, 1996; Ross, 1978; Sponsel, 1989; Torres-Trueba, 1969).

By the time of anthropological study in the Amazon Basin, small, mobile societies did predominate. Recent research agrees that intensive slash-and-burn cultivation can strip soil of nutrients and essential structure, rendering a tropical forest ecosystem as "vulnerable as a hemophiliac" (Weischet and Caviedes, 1993: 276). Yet discoveries of organic-rich anthropogenic soils (Arroyo-Kalin, 2010; Heckenberger et al., 2003; Mora et al., 1991), extensive prehistoric earthwork features (palisades, berms, moats, fish enclosures, human-made islands [Erickson, 2000; also see Cleary, 2001, p. 75 for summary]), and abundant decorated ceramics (Roosevelt, 1994; Mora et al., 1991) are suggestive of large, sedentized communities beginning at c. 2500 B.P. Paleobotanical remains of *Manihot* spp., *Dioscorea* spp., and maize (*Zea mays* spp.) suggest mixed-crop cultivation in the forested uplands (Denevan, 1992; Heckenberger et al., 2003; Smith and Heckenberger, 2009), with intensive maize agriculture on river floodplains (Dickau et al., 2012; Mora et al., 1991; Roosevelt, 1980, 1989, 1994; van der Merwe et al., 1981). Is it possible to reconcile these alternative bodies of evidence?

The theater for these events is the vast Amazonian ecosystem of c. 6.1 million km^2, comprised of diverse habitat types with variable potential to support human populations. River floodplain areas (the *várzea*) contain silt and organic-rich soils that support an array of aquatic prey species. The convergence of multiple ecosystems in the várzea offers a variety of resources (Denevan, 1992; Lathrap, 1968; Meggers, 1996; Roosevelt, 1980, 1994). However, the várzea makes up only a small fraction of the Amazonian land base relative to the drier, upland *terra firme* (Heckenberger, 1998; Wilson, 1999).

If várzea areas were capable of supporting large, sedentized populations as argued by Denevan (1992), Roosevelt (1994) and others, assumptions about ecological limitations of the Amazon Basin on human populations need to be reconsidered. True, initial immigrants would have found that much of the biomass in neotropic forests is inaccessible to humans, but pockets of high productivity do exist (Cleary, 2001). These would have opened opportunities for enterprising and observant foragers.

Part of the explanation for the discrepancy between ethnographically observed foragers and archaeological evidence of agriculturists is external to environmental capacity (Cleary, 2001; Denevan, 1992; Forline, 2008). Upheavals in Native Amazonian societies from European incursions included military attacks, slavery, and disease. Survivors retreated to remote areas or would have been reduced to 'jockeying' for introduced goods and services. One

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example is shrinking village size and complexity in the Xingú River drainage at the time of European contact is attributed to colonization (Heckenberger, 1998; Heckenberger et al., 2003; Smith and Heckenberger, 2009). There is evidence that the Guajá of the eastern Amazon abandoned floodplain agriculture after contact and began foraging in interfluvial zones and headwater areas (Forline, 2008). These disruptions would have reduced populations dramatically and had devastating effects on political structures and ethnic identity.

These disruptions did not play out on an even stage, however. Varied habitats and thousands of years of human occupation established a range of 'pre-contact' types of social organization and it is reasonable to expect that European incursions would have affected agricultural societies differently than foragers. To explore variability in social organization we need to describe *initial conditions*, in Binford's sense (2001) of the basal system state from which likelihood of major change can be predicted.

Initial conditions of Amazon Basin agriculture are intensified foraging and small-scale horticulture of the Holocene. An important source of reference information is the foraging lifeway of people living under similar conditions today. Warnings about ethnographic analogies as simple proxies for the past (sensu Heckenberger, 1998; Roosevelt, 1994) are well-taken, but it is possible to anticipate patterning in the archaeological record by discerning relationships between *linked variables* in ethnographic and archaeological data sets.

Thus, germane characteristics of foragers and small-scale gardeners – the predecessors of farmers –- are an essential frame of reference to structure research about anticipated archaeological correlates of early agriculture (Binford, 2001; Johnson, 2008; Yu, 2008). Understanding the basal or reference human ecology for the Amazon in the Contact period of c. 600 years ago implicates foraging system change *during preceding periods*. Identifying the conditions likely to precede a transition from foraging to farming will allow me to predict when intensive agriculture would (or would not) have occurred in the Amazon Basin. Archaeological indicators of such pre-conditions of the agricultural transition can then be evaluated relative to what we know about the archaeological record.

Establishing this frame of reference is best accomplished with methods to model foraging behavior that were pioneered by Lewis Binford (1980, 1983, 2001). More than any other anthropologist, Binford elucidated variability in foraging systems and explored conditioning effects of habitat, neighbors, and other factors. This paper discusses the foraging niche and intensification relative to incipient agriculture, and then identifying patterns in a relevant but independent empirical data set: Binford's (2001) comprehensive ethnographic database of foraging peoples (see Fig. 8.1).

These quantitative and comparative data are augmented with qualitative observations about the Pumé, a foraging-gardening group residing in south-central Venezuela (Gragson, 1989; Greaves, 1997, 2006; Leeds, 1961; Mitrani, 1988; Petrullo, 1939). I lived in a traditional Pumé community during 1992–1993 and observed them dealing every day with conditions and situations that are germane to the interface between tropical foraging and agriculture.

1. Tactical responses to a packed landscape and system transformation

Coping tactics that precede the transition to food production should be predictable and observable. Intensification, defined as any practices that increase productivity of food sources per unit

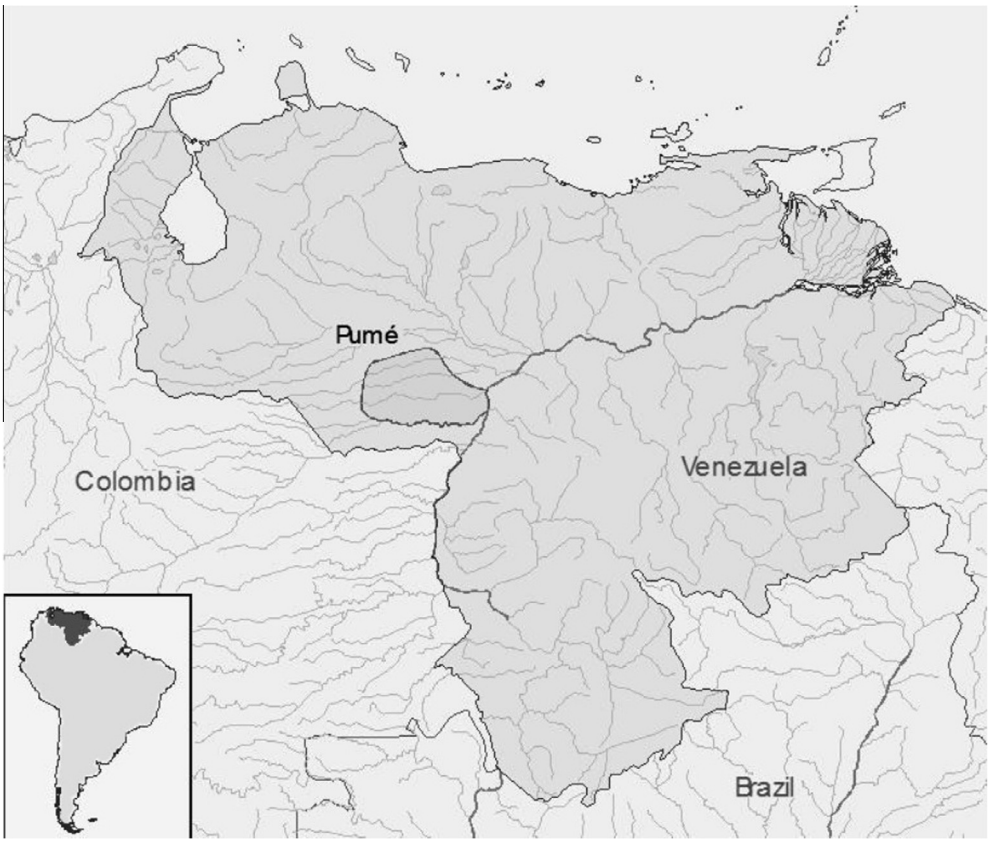

Fig. 8.1. Map of Venezuela with Pumé traditional area and study community of Doro Ana (Greaves, 2006:129, used by permission).